

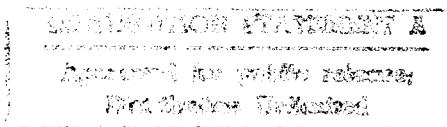


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An Analysis of Possible Threats to Shipping in Key Southeast Asian Sea Lanes

Henry J. Kenny



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Introduction

International sea lanes through Southeast Asia are important to the economic well-being of billions of people throughout the world. As the interdependence of nations continues to grow, prolonged interruption of the vast amount of merchandise trade through these waters would seriously damage the economies of Southeast Asia and require the trading nations of Asia and the Pacific to make difficult adjustments.

This survey assesses the vulnerability of these sea lanes to blockage, focusing on three factors: the *likelihood of blockage*, to include a realistic appreciation of the possibilities and probabilities of blockage; the *extent of blockage*, ranging from full blockage to minor disruption or curtailment of maritime traffic; and the *duration of blockage*, ranging from days to years. Both potential military and non-military causes for blockage are evaluated in terms of these three factors. A separate study by the Center for Naval Analyses (CNA) examines the direct economic impact of the blockage of these key straits.¹

Four potential non-military threats identified and analyzed here are: regulation by national governments, piracy, accidents and petroleum spills, and natural disasters. After pointing out economic, political, and military reasons why states of the region should not wish to block the straits under current conditions, the study posits five scenarios in which military action conceivably might take place: (1) the use of sea mines by either terrorists or belligerents in a conflict, (2) an attack on shipping by any Southeast Asian nation, (3) a conflict between Southeast Asian nations, (4) military intervention in the region by an outside power, and (5) conflict involving an outside power that would directly affect the region. In its review of these potential military threats, this analysis examines the capabilities of belligerents to disrupt shipping, as well as their intentions from the point of view of their economic and political interests.²

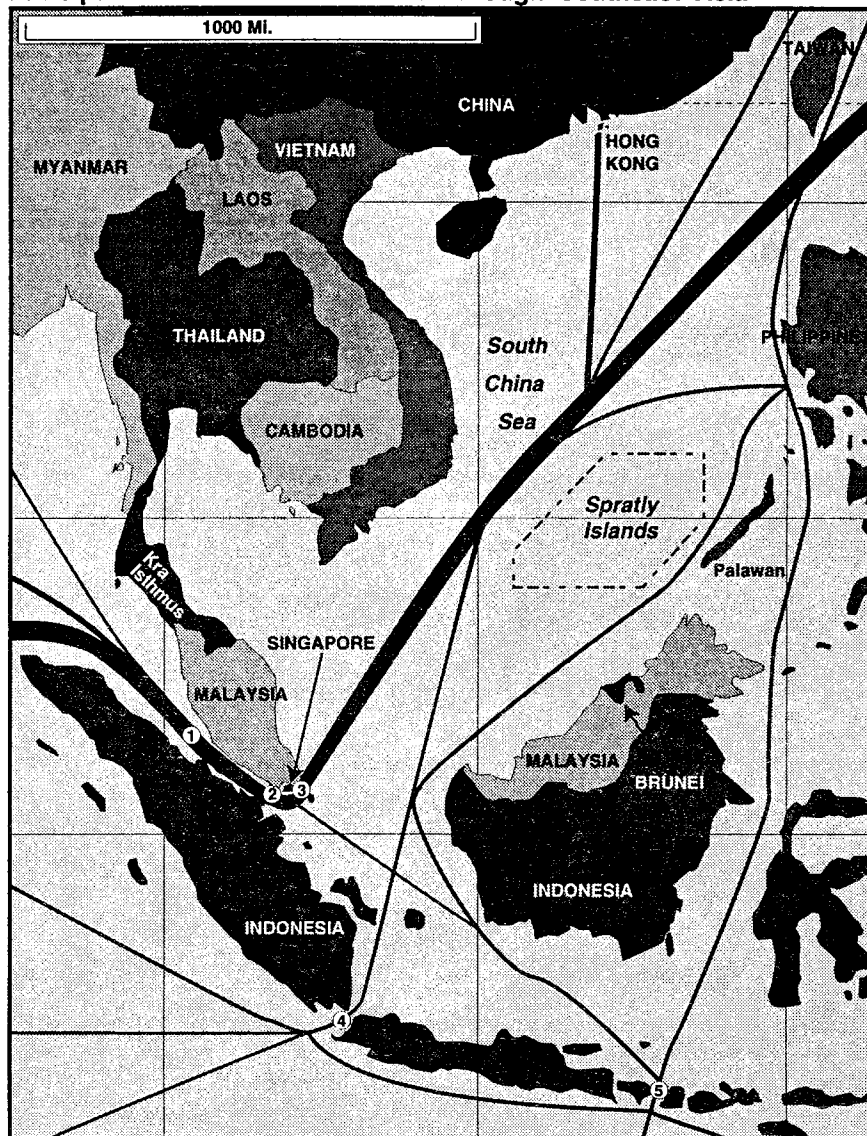
Southeast Asian sea lanes

The map on page 3 shows the principal sea lanes through Southeast Asia.³ Those most heavily trafficked and of greatest significance for international trade are the straits of Malacca, Sunda, and Lombok, and the sea lanes of the South China Sea. This assessment is limited to these four waterways and includes, as part of the Strait of Malacca, the Phillip Channel and the Strait of Singapore. The sea lanes through the South China Sea focus on the main northeast-southwest channels between Palawan and the Spratlys, and between Vietnam and the Spratlys. These Southeast Asian sea lanes are rapidly becoming the most heavily trafficked in the world. Over 200 ships per day pass through the Strait of Malacca alone, and projections point to dramatic increases in that volume in the coming years.⁴ Thus, a description of these sea lanes is an appropriate place to begin this survey.

The **Strait of Malacca** is the main passage between the Indian Ocean and the South China Sea. It is 600 miles long, and is 300 miles wide on its western side. Heading east, it narrows considerably into the Phillip Channel and the Strait of Singapore to under 3 miles at its most constricted point, with passage limited to a navigable channel of just 1.5 miles. It is relatively shallow, with some points just 72 feet deep, so that the maximum draft recommended by the International Maritime Organization (IMO) for passing ships is 19.8 meters (65 feet). The length of the Singapore Strait, which connects Malacca with the South China Sea, is 75 miles, with an overall width of less than 12 miles.

Lombok is wide and deep, less congested than the Strait of Malacca, and used as an alternative to it. It is sometimes used for the largest tankers transiting between the Persian Gulf and Japan, and is considered the safest route for such tankers. The minimum channel width is 11.5 miles at the south end of the strait, and depths are greater than 150 meters in most places. Most ships transiting Lombok also pass through the Makassar

Principal International Sea Lanes Through Southeast Asia



Legend: 1 Strait of Malacca, 2 Phillip Channel, 3 Strait of Singapore, 4 Sunda Strait, 5 Lombok Strait

Strait, between Kalimantan and Sulawesi, with a navigable width of 11 miles and a length of 600 miles.

Sunda, another alternative to Malacca, is 50 miles long. Its northeast entrance is 15 miles wide, but because currents are strong and the depth of water is limited, deep-draft ships of over 100,000 DWT do not use the strait. According to the Defense Mapping Agency, "The straits to the north leading into the South China Sea are shallow and dangerous. This route saves only 150 miles compared with the safer route through Selat Lombok." For these reasons the strait is not heavily used.

The **South China Sea** is larger than the Mediterranean. It stretches 1,800 n.mi. from Sumatra to Taiwan and is home to four principal island groups and three major zones of petroleum exploration. It also provides the sea lanes connecting Northeast Asia with Southeast Asia and the Middle East. In the southeast quadrant of the sea are the Spratly Islands, a multitude of reefs, shoals, cays, and rocks barely above water at high tide and long known to mariners as the "dangerous ground." Merchant ships steer clear of the Spratlys. Some follow lanes to their east along Palawan to and from the Philippines, but the majority run west of the islands in a northeast-southwest direction over an area some 150 n.mi. wide.

Economic and strategic context

The value of the two-way international trade that passes through these sea lanes is enormous. In 1994, based on estimates of data reported by the International Monetary Fund, it amounted to nearly a trillion U.S. dollars. As shown in table 1, this figure is the total of the major trading countries alone.⁵ The ASEAN countries as a group are by far the largest user, but Japan has more trade than any single nation. China, Taiwan, Hong Kong, and South Korea are likewise heavily dependent upon this trade. It is significant that the figures in table 1, though large in aggregate value, are likely to increase even more in the immediate future. During the past five years, for example,

the value of Asian trade has increased 79 percent. A subsequent section contains further details of this trade as it affects the likelihood of disruption of shipping.

Table 1. 1994 trade via the Southeast Asian straits (billions of 1994 U.S. dollars)

Nation or group	Exports	Imports	Total trade
Japan	139.0	121.4	260.4
South Korea	26.3	35.4	61.7
China	30.7	34.9	65.6
Hong Kong	38.3	37.3	75.6
Taiwan	25.3	29.3	54.6
ASEAN	204.1	227.5	431.6
Total	463.7	485.8	949.5

The strategic context in which this trade developed was one of peace and stability. Although the Vietnam War led to increased U.S. shipments to and investments in the Philippines, Hong Kong, Vietnam, and Thailand, the economic growth of Southeast Asia is overwhelmingly the result of indigenous entrepreneurship. It was export-led, stimulated by heavy investment—first from Japan and, to a lesser extent, the United States and the Asian newly industrialized countries—and predicated upon freedom of navigation.

Until recent years, the security concerns of the region were still primarily on land, with domestic insurgency at the top of the list. The issue today is whether the peace and stability that has generally prevailed for the past 20 years will continue in light of rising maritime security concerns. These concerns are mitigated by the economic and political interdependence described later in this survey. They are, however, stimulated by perceptions that the United States will continue to withdraw from the region, that China is a rising power seeking to dominate the South China Sea, that Exclusive Economic Zones (EEZs)—many of which result in overlapping national claims—need to be

protected, and that the combination of ocean resources and EEZs encourages claims by several nations to the same islands. Maritime security concerns are also indicated by the quantitative and qualitative increases in naval forces throughout the region. This is the strategic context for the following analysis of possible non-military and military threats to shipping through the sea lanes of Southeast Asia.

Potential non-military threats

There are a number of non-military threats to the sea lanes. The first of these, government regulation, involves decisions by one or more national actors to control shipping; the second involves piracy, which is a perennial problem in Southeast Asia and is not unrelated to the third, accidents and petroleum spills. The fourth is natural disasters. Several ecological and safety problems are associated with the non-military threats listed, but we will focus specifically on the potential of each to curtail or halt shipping.

Government regulation

In recent years, congestion, particularly in the Strait of Malacca, has increased to the point where regional governments are considering requiring prior notification for transit, designating sea lanes, and taxing passing ships. With the approval of international shippers, Malaysia and Indonesia already separate traffic in the strait with buoys and designate lanes for the purpose of safety. They have also attempted to designate specific and separate channels for transiting ships. Over the past dozen years, Indonesia has regularly attempted to increase its range of control, stating that safety reasons demand that it control traffic. It has also requested authority to tax shipping for the purpose of maintaining safety measures. Moreover, the powerful Indonesian Minister of Science and Technology, Mr. Habibie, has recently been actively seeking to redirect traffic from Malacca to Lombok, in the hope of bringing economic benefit to his nearby home state.

The international community has resisted these and other attempts by the states of the region to restrict or redirect traffic. Singapore is particularly opposed, because any redirection would seriously damage the considerable income it derives from servicing passing ships.⁶ The maritime nations instead support the authority of the International Maritime Organization, an arm of the United Nations, to regulate traffic and to tax and oversee the overall safety measures implemented by the littoral countries. Shippers have agreed to the safety regulations of the IMO and to abide by its International Regulations for Preventing Collisions at Sea. Given the rapid rise in tonnage through the straits, however, it is becoming clear that further IMO regulations may be necessary to maintain a steady flow through congested waters. Such regulations might take the form of designating sea lanes through the archipelagic waters off Indonesia and Malaysia, restricting regular access by very small ships, and denying access to very large supertankers, particularly through the Strait of Malacca.

Because congestion is a function of the number of ships transiting the straits, maritime experts believe that reducing the number of small ships allowed to transit and replacing them with medium-sized ones could allow tonnage to increase by as much as a factor of four. This step would address one aspect of the problem. The other is that very large crude carriers (VLCCs) risk touching bottom in the shallower sections of Malacca. They are already being encouraged by Indonesia to transit either Lombok or Sunda, and are limited by the IMO to a draft of less than 65 feet. Nevertheless, many large tankers, a few of which are loaded in excess of the draft limitations, continue to transit Malacca each day.

Another solution, advocated by many in Thailand and by Prime Minister Mahathir of Malaysia, is to construct a "land bridge" across the Kra Isthmus, so that oil tankers could off-load via the pipeline to tankers in the Gulf of Thailand, and container ships could off-load to rail or road transportation for similar transshipment. Although this scheme is not an operational proposal at

this point, it could, in the future, reduce transit time as well as congestion in the Strait of Malacca (and benefit the economies of Malaysia and Thailand). Disadvantages of the scheme are that it could increase handling costs to shippers, increase congestion in the Gulf of Siam, and create disputes between Thailand and Malaysia for both economic benefits and control of sea lanes. Table 2 summarizes the various options to reduce congestion.

One of the longer-term solutions to reducing dangers posed by the VLCCs is already in sight—new large ships being constructed by manufacturers in Europe and Asia are in the 150,000- to 200,000-ton range, for the simple reason that the older and larger 300,000+ VLCC class cannot access most world terminals, and maritime trade practice is increasingly emphasizing off-loading and transshipment via a multitude of ports.

In summary, attempts to increase government regulation, prompted by the ever-increasing rise in sea lane traffic, appears inevitable. Table 3 (page 15) shows the likelihood, extent, and duration of such regulation for each strait.

Piracy

The London-based International Maritime Bureau (IMB) has defined *piracy* as “the act of boarding a vessel with the intent to commit theft or other crime and with the capability to use force in furtherance of the act.” By this definition, piracy has a long history in Southeast Asia—before, during, and after the colonial era. In modern times the region has developed a well-earned reputation as a leading center for piracy. In 1993 and 1994, according to the IMB, about three-quarters of all international piracy incidents took place in Far East/Southeast Asian waters—76 of 103 reported attacks in 1993 and 71 of 90 in 1994. The main danger areas are the “Hong Kong–Luzon–Hainan triangle” at the northern end of the South China Sea, the East China Sea, and the southern end of the straits of Malacca and Singapore opposite Indonesia.⁷

Table 2. Options to reduce congestion

Option	Build Kra Isthmus			Designate sea lanes
	Pipeline/road	land bridge	Restrict small ships	Restrict large tankers
Rationale	Pipeline/road	Reduce numbers and times allowed to pass	Restrict small ships	Designate sea lanes
Rationale	Bridge would reduce distance and congestion, have economic benefits for Thailand and Malaysia.	Small ships increase congestion without delivering large tonnage.	Large tankers can touch bottom or cause massive oil spills.	Sea lanes would increase safety of navigation; territorial control by the littoral states.
Effect	Would reduce Malacca congestion, but be expensive and cause Gulf of Siam sea lane disputes.	Local shippers would protest; tonnage could increase fourfold.	Would reduce potential for massive oil spill.	Would reduce non-transiting ships (fishing) and protests by trading states.
Likelihood	Very low—unless congestion becomes unbearable	Moderate restrictions at the margin in short term; more in future	Medium for redirecting some loaded VLCCs away from Malacca	Likely attempts by Indonesia and Malaysia

Navigation in Southeast Asia can be very hazardous because of piracy. Oil-laden tankers transiting narrow straits need to slow to negotiate difficult passages. This is particularly true in the Strait of Malacca as the tankers approach the Phillip Channel and the western end of the Strait of Singapore. As they decrease speed, they are more vulnerable to pirates, most of whom sally forth at night from heavily vegetated islets off the Indonesian coast. The pirates frequently incapacitate the captain while robbing the master safe. In 1991, for example, a Panamanian-flagged tanker loaded with crude oil was attacked in the heavily trafficked Phillip Channel and was reported "out of control" (not under command) for 20 minutes while the crew was tied up. In 1992, a ship reportedly commandeered by pirates collided with a supertanker in the northern end of the Malacca strait, killing all the crew and spilling 13,000 tons of oil. Between 1989 and 1993, there were two other cases of vessels "not under command" as a result of pirate attacks.⁸

Industry, government, and the international community are reacting to the problem. Owners and operators are taking specific action to reduce the risk of attack, such as initiating deck patrols, increasing deck and rail lighting, maintaining fully pressured fire hoses to drive off pirates, and planning sailing schedules that avoid high-risk areas and times. U.S. companies are conducting a series of instruction sessions to prepare crews and owner-operators to take preventative measures to frustrate pirates. The governments of Indonesia, Malaysia, and Singapore have recently reached three bilateral agreements in which each country agreed to share information and allow hot pursuit by the other nations' patrols into their territorial waters, while still retaining the authority to arrest the suspected pirates. Rear Admiral Kwek Siew Jin of Singapore described the effectiveness of this arrangement at the 1995 International Seapower Symposium.⁹ The international community is also reacting; in October 1992, the IMB established a Regional Piracy Center in Kuala Lumpur, Malaysia. The Center receives reports on piracy

incidents and provides warnings and reports to ships passing through the straits.¹⁰

These measures resulted in a temporary decline of piracy in Southeast Asia, especially in the Strait of Malacca. According to the Office of Naval Intelligence (ONI) "Violence at Sea" database, maintained by The Naval Postgraduate School, piracy incidents in Southeast Asia alone (excluding the East China Sea incidents listed in the IMB data above) declined from a high of 120 in 1991 to half that figure in 1992 and 1993. Incidents off Indonesia, where the risk to shipping is greatest, were cut by two-thirds to 11 in 1993. Piracy incidents increased in 1994, but were largely confined to attack on or theft from ships at anchor. Scams, in which entire ships were retrofitted and papers forged, enabled illegal syndicates to seize whole cargos in port without detection. Like urban crime when the pressure is on, however, the piracy has shifted elsewhere, notably to the South China Sea, where annual incidents have more than tripled since 1992. Many of these incidents emanate from southern China, often from Shan-wei (60 km northeast of Hong Kong). Piracy is common in the Sulu Sea as well, so that over half the reported incidents worldwide continue to occur in Southeast Asian waters.¹¹

Although the movement of piracy at sea from the congested straits near Singapore to the more open waters of the South China Sea reduces the risk that such piracy could threaten shipping safety, such risk is not negligible. The continuing risk to slow-moving VLCCs near Singapore, the harassment of shipping in the northern South China Sea, and the threats to vessels in Philippine waters, all point to a medium likelihood of threat in these areas. Thus far, this problem has not affected the volume of trade. Ships are not detouring the straits to avoid pirates. The aforementioned danger of loss of ship control during pirate attacks, however, enhances the probability of running aground in congested areas, particularly in the Strait of Malacca, so that the extent of blockage in this strait would be more significant than in Lombok, Sunda, or the South China Sea. The duration of

blockage, however, would be short. The second column of table 3 summarizes these results.

Accidents and petroleum spills

Growing congestion in the straits could well mean more collisions and groundings. A 300,000-ton supertanker touched bottom in the early 1990s, reaching the 72-foot water depth of one of the shallowest points in the Strait of Malacca. Ship draft in the strait is limited to 65 feet, but as very large tankers increase speed, their draft increases due to the venturi effect, increasing the risk of touching bottom. Congestion is mitigated somewhat by the fact that a few of the largest tankers transit Lombok, but many more continue to use Malacca.

Accidents could also occur with ships not under command for sundry reasons, including the aforementioned piracy. Assuming that a couple of large vessels were to collide in a congested channel, such as the Strait of Singapore, the result would be a slowdown in traffic, rather than an extended or complete shutdown. In mid 1992, a large vessel foundered in that strait and was towed to port in short order. The port of Singapore is particularly well equipped with salvage equipment, and could salvage ships in a matter of days. An alternative, in the case of several sunken ships that impede traffic, would be to destroy them in place with explosives. Under ideal circumstances this could be done in a matter of days. Nevertheless, the impact of accidents could be dramatic in a strait such as Malacca, through which more than 200 ships pass per day. Like a highway traffic jam, accidents can impede the flow of traffic downstream and upstream, so that shipping might be delayed for weeks.

Southeast Asian states are also concerned about the deleterious environmental impact of accidents involving petroleum shipments through the straits. In the case of a tanker carrying liquified natural gas (LNG), the obvious concern is an explosion. A LNG tanker accident, however, is not as dangerous as popularly believed. The puncture of a cryogenic tank, for example,

would cause leakage of liquified gas, but tests have shown that the liquid is somewhat difficult to ignite, and the potential enormous explosion from spontaneous combustion would occur only if the liquid gas escaped into a closed chamber, a highly unlikely event even in a major LNG tanker accident. In the case of an oil spill, the major concern is for ecology rather than navigation. It is estimated that the distillates from a major spill would evaporate within 48 hours of the spill, and that, thereafter, ships could transit while having to pass through only the remaining sludge—which might necessitate some later ship clean-up, but would not impede navigation. Because of the environmental concern, however, the states of the region are actively trying to limit VLCC passage through Malacca, with the result that such traffic is likely to be further restricted in the future.¹²

As summarized in table 3, there is a medium likelihood of further accidents in the Strait of Malacca. These accidents are not likely to delay traffic for more than days, or weeks in the more severe cases. The safety of transit will become an increasingly important environmental issue to shippers and governments alike, so that further restrictions on transit through Malacca can be expected. In the narrow waters of Malacca, the extent of blockage would be significant, but would probably be far less so in the other straits. The result would be more use of Lombok and, to a lesser extent, Sunda. The overall flow of trade through the Southeast Asian waters would not be significantly impeded.

Natural disasters

The above conditions pertain to man-made problems; there are others out of anyone's control. Bad weather, earthquakes, and volcanic activity are a few types of natural phenomena that have restricted traffic movements through these areas for short periods of time.

Each year during early autumn, the northeast monsoon crosses the northern portion of the South China Sea, gradually

moving southward and striking the Gulf of Thailand around November. Winds accompanying these monsoons are not hazardous to shipping (generally in the 5- to 15-knot category), but the tropical cyclones that often occur during the same period do present a problem. An average of nine typhoons, with winds often reaching 130 knots or more, strike portions of the South China Sea each year.¹³ Farther south in straits off Indonesia and Malaysia, such cyclones are rare, and are usually small and weak. The bottom line is that cyclones could disrupt shipping for short periods in the South China Sea; however, even if several ships were to be sunk in the process, there is ample passage through those waters; so shipping would be disrupted only while ships waited for the storm to pass. In the more congested straits off Indonesia and Malaysia, cyclones present little to no problem.

Earthquakes and volcanic eruptions occur from time to time in Indonesia and Malaysia. The famed Krakatoa eruption of 1883 was described as catastrophic, throwing ash over a 300,000-square-mile area, accompanied by explosions heard as far as Australia and Sri Lanka, and producing a succession of seismic sea waves that swept the shores of the Sunda strait and destroyed five towns.¹⁴ In early 1996, 62 people were killed by a powerful earthquake and subsequent tidal waves in eastern Indonesia.¹⁵ Judging from the frequency of major disasters throughout history, however, their likelihood must be considered low, even though the extent of damage could be significant. Obviously, the eruption of a volcano such as Krakatoa today would halt shipping through the Sunda strait for several days or weeks. Lesser volcanos might cause a delay of a day or two, as would earthquakes that could create high waves disruptive to shipping. Thus, in the event of either an earthquake or all but the most extraordinary volcanic eruptions, a typical shipment of crude oil to Japan might be delayed but 1 or 2 days out of a 40-day voyage.

Based on the foregoing discussion, table 3 summarizes the vulnerability of the sea lanes to non-military threats in terms of

likelihood of blockage or disruption, the extent of blockage anticipated, and its duration.

Table 3. Vulnerability of Southeast Asian straits to non-military factors^a

	Govt. reg.	Piracy	Accident	Nat. dis.
Malacca				
Likelihood	H	M	M	L
Extent of blockage	M	M	M	H
Duration	Y	D	W	D
Sunda				
Likelihood	M	L	L	L
Extent of blockage	L	L	L	M
Duration	Y	D	D	D
Lombok				
Likelihood	M	L	L	L
Extent of blockage	L	L	L	M
Duration	Y	D	D	D
South China Sea				
Likelihood	L	M	L	L
Extent of blockage	L	L	L	L
Duration	Y	D	D	D

a. Likelihood/extent: H = high, M = medium or partial, L = low.
Duration: Y = years, W = weeks, D = days.

Potential military threats

This section first examines important economic, political, and military reasons why no nation in Asia, under normal circumstances, would seek to impede the flow of trade through Southeast Asian waters. These reasons include the countries' strong dependency on trade via the straits, the negative political reactions of their trading partners, and possible military retaliation by affected states. Because circumstances could change, however, even to the point where disagreements lead to hostilities, this section also examines five scenarios under which

nations may take action that could impede sea lane traffic, even if such action appears detrimental to their national interests at the present time.

Economic dependency

There are compelling economic reasons why no country would deliberately attack shipping in these sea lanes, and would not tolerate any country that attempted to do so. Southeast Asian nations—as well as other countries both in and outside the immediate region—are heavily dependent on these lanes for trade and would suffer directly were maritime traffic impeded.

Using International Monetary Fund data, this analysis estimates the value of annual trade that passes through the sea lanes to and from Brunei, Indonesia, Malaysia, the Philippines, Thailand, Singapore, Vietnam, China, and Japan.¹⁶ Domestic trade within the Southeast Asian nations was not included. Each country imports and exports significant amounts of goods through these waters, both in absolute amounts and as a percentage of each country's domestic output. Table 4 shows just how much. On average, well over half the annual exports and imports of these countries travels via the straits of Malacca, Sunda, Lombok, and the South China Sea. The value of this trade totalled nearly a *trillion* U.S. dollars in 1994, and ranged from 6 percent of GDP for Japan to 311 percent for Singapore. These figures include only the ASEAN countries and the two non-ASEAN nations with the greatest economic dependency on the straits—China and Japan.

Southeast Asian nations

Being closest to the sea lanes, the ASEAN countries collectively have the greatest ability to affect this shipping. However, the seven nations as a whole benefit more than any other region from the open sea lanes. As shown in table 1, their combined total trade through the straits in 1994 approached half a trillion dollars. Individually, as seen in table 4, the four countries with the strongest naval and air forces—Indonesia, Malaysia,

Table 4. Value of trade for select Asian countries passing through major Southeast Asian sea lanes (\$billions)^a

Country	1994 exports via SEA sea lanes	1994 imports via SEA sea lanes	Total trade via SEA sea lanes	Percent trade via SEA sea lanes	Percent 1994 GDP
Brunei	2.0	3.0	5.0	95	94
Indonesia	35.7	28.2	63.9	94	41
Malaysia	55.8	56.6	112.4	95	161
Philippines	4.0	8.5	12.5	35	20
Thailand	39.3	51.5	90.8	95	69
Singapore	91.6	97.1	188.7	95	311
Vietnam	4.4	8.1	12.5	93	65
Japan	139.0	121.4	260.4	39	6
PRC	30.7	34.9	65.6	27	16

a. All figures are estimates; n.b.: the combined total does not equal the totals in table 1 because trade in this table includes trade by each nation with each other nation, including those in the table, whereas table 1 excludes such trade for purposes of eliminating double-counting in estimating total trade via the straits. Percent of 1994 GDP is based on GDP reported by the International Institute for Strategic Studies, *The Military Balance 1995-96*, October 1995. The Southeast Asian sea lanes considered here include the straits of Malacca, Sunda, and Lombok, and that portion of the South China Sea to the east and west of the Spratlys.

Singapore, and Thailand—exported and imported enormous quantities of goods through the sea lanes last year. Singapore was the most active with \$189 billion in trade, followed by Malaysia (\$112 billion), Thailand (\$91 billion), and Indonesia (\$64 billion). The significance for these countries is more apparent when their trade is normalized against domestic output. In 1994, Indonesia and Thailand traded amounts of goods with values of 41 and 69 percent of GDP, respectively, while Singapore's and Malaysia's trade far exceeded their respective domestic outputs, a fact indicating the extent of their economic dependence on processing raw materials from abroad.¹⁷ Even these figures understate the importance of the straits to Southeast Asian nations, as they do not include domestic shipping. Based on this enormous economic dependency alone, the ASEAN countries have powerful motivation not to initiate or condone actions that would adversely affect shipping through the straits.

Japan

Japan's stake in open shipping through Asia is by far the largest of any country considered. As shown in table 4, it traded an estimated \$260 billion worth of goods by way of the Southeast Asian sea lanes in 1994, including the 80 percent of its total oil imports that come from the Middle East.¹⁸ In addition, Japan relies heavily on petroleum and other resources from Southeast Asia, which must transit the South China Sea. Thus, in any scenario that restricted sea lane traffic, Japan could be expected to use its considerable economic influence to restore freedom of navigation.

China

China has a strong interest in open Southeast Asian sea lanes, both because of its own trade via those lanes and because the lanes are so vital to its economic relationships in Asia. The value of China's strait-related trade totalled \$66 billion in 1994 and was expected to exceed \$75 billion in 1995. If Chinese external trade via Hong Kong were included, annual trade would be over \$100 billion at the present time. During the past five years,

Chinese trade has grown an average 16 percent annually, and its dependency on Southeast Asian sea lanes is expected to grow dramatically in the next few years. The overall demand for energy in China is projected to increase 160 percent by the year 2015, while the need for oil, mostly from the Middle East, is expected to more than triple.¹⁹ Indeed, if the gas reserves of Yacheng were not tapped, the growth of petroleum production in China would likely remain flat.

With grain production down 2.6 percent in 1994, China also shows indications of the need to import food.²⁰ For these reasons, China's dependency on other countries for basic resources will increase in the coming years, as will its need for safe maritime transit routes. China also has an interest in open sea lanes because they are crucial to Japan and its other trading partners. Chinese Ambassador Cheng Ruisheng recently pointed out that China needs an economically robust Japan for trade, investment, and developmental assistance. Were Japan to suffer from blockage of the Southeast Asian sea lanes, China could be expected to suffer as well. The same applies to Korea and Taiwan. This does not mean that China will drop its claims to the Spratlys or normalize ties with Taiwan, but it underscores the fact that Beijing would not lightly take actions that would risk impeding the maritime traffic so vital to its future.

Political disincentives

Political disincentives also militate against an attempt by any nation to seriously impede maritime traffic. These disincentives would likely include at least the following:

- Condemnation by ASEAN, which is committed to economic cooperation and free trade. Any attempt to disrupt traffic would meet with ASEAN condemnation and loss of face for the perpetrating nation.
- Condemnation by other organizations. The ASEAN reaction would undoubtedly be paralleled by other international organizations, ranging from the Asia Pacific

Economic Cooperation (APEC) forum to the United Nations, and including financial institutions such as the Asian Development Bank, on whom the perpetrator is dependent.

- A cut in, or elimination of, bilateral and multilateral foreign aid.
- A sharp curtailment of bilateral and multilateral investment.
- A reduction or cessation of international trade.
- A reduction or elimination of technology transfer.
- A possible coup or effort to eliminate the ruling clique that instigated the anti-shipping action.
- Condemnation by individual nations that use and depend upon these straits, as well as by other maritime nations, including the major world powers.

Military constraints

Strong military constraints further inhibit acts of war in the sea lanes. First and foremost is the distinct possibility of a military reaction by the United States. A 1995 Department of State policy statement called freedom of navigation a "fundamental interest of the United States," and a Department of Defense strategy report stated as follows:

Our strategic interest in maintaining the lines of communication linking Southeast Asia, Northeast Asia and the Indian Ocean makes it essential that we resist any maritime claims beyond those permitted by the Law of the Sea Convention.²¹

Conceivable military reactions to attempts to disrupt the Southeast Asian sea lanes include:

- Intervention by the Seventh Fleet at the request of the affected states

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- Formation of a coalition of forces led or supported by the United States to oppose the aggression
 - Depending on the type of aggression, military action by other affected nations, either unilaterally or in concert with states sharing a mutual interest in keeping the sea lanes open.

Conflict scenarios affecting the sea lanes

Despite the aforementioned economic, political, and military constraints, circumstances in Asia may change, or a government or group may make decisions in which political or military “imperatives” outweigh the perceived risks of aggressive action. It is therefore important to consider scenarios in which trade might be blocked. Five such scenarios are: (1) the threat or use of sea mines, from whatever source, (2) an attack on shipping by any of the Southeast Asian states, (3) a conflict between Southeast Asian states, (4) military intervention in the region by China, and (5) possible Chinese action in the East China Sea that would affect shipping in Southeast Asia.

The first two scenarios pertain to actions directly intended to block the straits. The last three include confrontations in which the spillover effect of a regional conflict could have direct impact on shipping via the Southeast Asian sea lanes, including scenarios in which China intervenes either in the Beijing-claimed Spratly Islands or oil fields near the Vietnamese continental shelf, or initiates a blockade of Taiwan, with a potentially damaging effect on regional shipping.

Scenario 1: An antagonist uses or threatens to use sea mines

The threat or use of sea mines constitutes a potentially serious threat to the Southeast Asian sea lanes. Either a protagonist in a military conflict or an international terrorist organization in a non-military scenario, perceiving strait shipping as vulnerable to mines, could seek to disrupt traffic by the threat or use of

mines. There are 48 navies capable of laying mines at sea today, an increase of 41 percent in just four years.²² Mines could also be laid by a variety of civil aircraft or ships.

Sea mines are relatively inexpensive and easy to lay by air, surface ship, or submarine. During World War II, for example, U.S. and R.A.F. pilots dropped magnetic and acoustic mines in the entrance to the port of Singapore. The United States also used mines effectively against North Vietnam in 1972, when U.S. aircraft sharply reduced waterborne traffic by seeding rivers and harbors. During the Gulf war, two USN ships were damaged by the explosive power of mines.²³

In either a Northeast or a Southwest Asian scenario, an antagonist could conceivably use its own military capability to dispense sea mines in the Southeast Asian sea lines of communication (SLOCs) in an attempt to prevent or delay passage of U.S. or allied war material and supplies, or to deny the SLOCs to USN ships en route to the theater of operations. A far more likely method, however, would be to dispense mines surreptitiously, in a manner not substantially different from that used by terrorist organizations. To sail a military ship to lay mines in congested waters near land-based air would risk both the ship itself and retaliation by the numerous powerful states using the straits, as described in subsequent analysis. In a terrorist mode, however, mines could be laid by a variety of methods, including ejection from a passing freighter. The advantage of this method is both ease of delivery and deniability with the expectation of avoiding retaliation.

The Strait of Malacca is particularly vulnerable to mining. It is relatively shallow, with currents usually below 3 knots, and characterized by confined waters.²⁴ Commodore Teo of the Singaporean navy, recently stated that "sea mines can be used to disrupt freedom of navigation through...the Strait of Malacca," which is why Singapore is planning to purchase four additional mine-countermeasures vessels.²⁵ Malaysia already has four modern MCM vessels and plans to acquire several more over the

next decade.²⁶ The area off the Malaysian coast has been described as ideal for mining:

The straits are easily mined. Malaysian coastal waters are sandy-bottomed and have an average depth of less than fifty meters....Areas with sandy bottoms are perfect for mines. The sand shifts and covers the mines until they are not visible on sonar, but does nothing to lessen the deadliness of the mines.²⁷

There are, however, some important constraints on the use of mines in the region. The other straits and the South China Sea are not as vulnerable to mining as the Strait of Malacca. Currents in Lombok and Sunda reduce the effectiveness of moored mines.²⁸ Bottom mines would not be effective in the deeper water of these channels or in the far deeper waters off the continental shelf of the South China Sea.

Other limitations include the difficulties of identifying and targeting particular ships rather than areas, as offensive mines typically do, and laying mines at the right time and place to attack particular ships. Although mines could be detonated by remote control, this could complicate the task of the attacker, increasing his risk of detection and reducing his probability of success. Drifting mines could easily wash away from Sunda and Lombok, but a sophisticated attacker could use tides in Malacca to great advantage. Again, any nation overtly attempting to lay mines would invite attack by neighboring states and the host of nations depending on shipping through the region. Reseeding mines in the face of active countervailing force would be difficult, and some of the mines already laid would be subject to neutralization by the very modest but growing mine-countermeasures capabilities of the Southeast Asian nations. (See the appendix, which lists the major weapon systems of Southeast Asian states.)

Another point of reference for analyzing the disruptive potential of mines in the straits is the tanker war of 1988. Although commercial ships struck several mines, only three

ships were totally lost, and there was little loss of life. Insurance rates rose dramatically at first, but when it became publicized that only 10,000 tons of cargo were lost, the rates came down. One reason for the low loss was the fact that ships normally can proceed for a substantial number of miles after striking smaller contact mines, thus enabling them to reach a nearby port for off-loading.²⁹ Because of this fact, an optimistic assessment is that the very high volume of traffic through Malacca might in itself clear the strait of mines. Supporting that assessment is the historic use of freighters to precede naval forces in clearing the Suez Canal in 1984, the compartmentalization of many freighters, and the buoyancy of petroleum in tankers. Such an optimistic outcome would depend on both the quality of ship (highly compartmentalized large ships are best) and the type mine encountered (small World War I type mines would cause the least damage).

A less optimistic assessment is that the threat of mines is enhanced by the growing sophistication of influence mines. Mines on the sea bed triggered by various influences created by passing ships can be very damaging; some might even split a ship in two. Larger mines striking less compartmentalized ships would be most destructive. Added to the growing sophistication of modern mines, the very threat of mines might deter freighters and tankers from entering certain waters in the first place—especially if mines had already struck passing ships. In any case, it is likely that clearing the sea lanes for normal traffic would require a concerted effort by several nations—using both minesweeping and minehunting naval capabilities, as well as possible limited use of large commercial vessels—and would entail considerable damage to shipping.

Given the difficulty of laying an effective minefield in the Sunda and Lombok straits and in the South China Sea, and the emphasis by the littoral states in developing effective mine-countermeasures capabilities, the future duration of blockage caused by mines in these sea lanes would likely last weeks rather than years. In Malacca, however, the relative ease with

which mines could be dispatched, the vulnerability of its narrow sea lanes, and the potential for laying a variety of mines combine to present a more extensive threat to shipping. A concerted effort might clear channels of mines within weeks, but blockage of the strait from damage to large vessels is entirely possible, particularly if several ships were struck and sunk in place. As Commodore Teo has pointed out, the Strait of Malacca is easily mined and therefore more likely to be targeted in the event of conflict or terrorist activity. Even the threat of mining could cause diversion of some shipping from Malacca. Because of the lack of obvious rationale for anyone laying mines in time of peace, however, the likelihood of such activity is generally low. These conclusions are summarized in table 6 (page 35).

Scenario 2: Southeast Asian states initiate action to impede the sea lanes

In the unlikely event a Southeast Asian state were to initiate military action, including the use of mines, against shipping in the sea lanes, its capability to do so on a sustained basis would be quite limited. **Brunei** has virtually no capability other than to harass ships crossing north of Borneo to and from the Philippines. **Cambodia** can affect shipping in the immediate vicinity of its coast, but not in the major sea lanes.

Due to its recent purchase of former East German vessels, **Indonesia** does seem to have enough ships to cause problems, but the condition of most of these ships is reportedly deplorable. At present, Indonesia is capable of patrolling a maximum of only one-third of its nearby sea lanes. Indonesian F-16s and Type 209 submarines could create problems, of course, particularly if Indonesia acquires the 17 additional F-16s offered by the United States in 1995. Were it to decide to initiate strikes against shipping, Indonesia could conduct limited attacks in all the straits but would have difficulty extending those attacks to the South China Sea.

Malaysia likewise could cause considerable damage to shipping in an initial strike. Its 48 combat aircraft and large

patrol fleet could cause considerable damage in the Strait of Malacca and southern portions of the South China Sea, but would have difficulty reaching the Sunda Strait, and even greater difficulty reaching the Lombok Strait.

The **Philippines** has virtually no naval vessels or aircraft that could impede shipping, and can barely affect traffic off Palawan. Its operational F-5s are numbered on one hand, and its naval forces are strictly brown water. **Singapore** has an obvious capability to disrupt shipping in immediately adjacent waters, while **Thailand**, which has one operational F-16 squadron, aircraft for another on order, and may buy a third, could definitely do so. **Vietnam** could cause problems only in the western sea lanes of the South China Sea.

The limited capability of Southeast Asian states to initiate military action against strait shipping is further reduced by the likelihood of countermeasures. In the event that both deterrence and diplomacy were to fail, a military reaction by any of the maritime nations affected by a blockage or curtailment of shipping through the sea lanes is a possibility. Given the number of such nations, the extent of their trade, and their military strength, some form of military retaliation is likely. Conceivable reactions could include:

- Intervention by the Seventh Fleet at the request of affected states, as previously mentioned, to include operations to counter aggressing forces.
- Military operations by China, which might include land warfare.
- A counterstrike by a coalition of naval powers, which could include any of the above, plus other nations of Europe, the Middle East, Northeast Asia, or Australia.
- Air and naval retaliation by other Southeast Asian nations. Even opposition by only one other Southeast Asian state would seriously degrade the strike capability of the initiating country.

Were any of the above actions to take place, the aggressor nation would find continued interference with shipping extremely difficult. In summary, Southeast Asian states are unlikely to take any unilateral action in the sea lanes that would impede the flow of goods so vital to their well-being. Were such action taken, there would be an immediate and strong impact on shipping, but the inability to sustain operations, coupled with the high likelihood of powerful political, economic, and military reactions by shipping nations, would render such blockage temporary. The combination of economic self-interest, political risk, and military folly make this scenario hypothetical for the foreseeable future. Table 6 summarizes these conclusions.

Scenario 3: Conflict erupts between Southeast Asian states

Although the foregoing scenarios involve aggression intended to block the sea lanes, scenarios in which the sea lanes were not the primary object of the conflict could also result in threats to shipping. A conflict between states of the region is such a scenario. It might be caused by competing claims to nearby islands, as described in table 5,³⁰ but could also be caused by a deterioration of relations between Indonesia and Malaysia. Though unlikely, a scenario in which historic animosities led to conflict would pose certain dangers to Southeast Asian SLOCs.

Table 5. Island disputes in Southeast Asia

Islands	Disputants
Padra Branca Islands	Malaysia, Singapore
Sipadan and Ligatan Islands	Malaysia, Indonesia
Louisa Reef	Malaysia, Brunei
Spratly Islands	China, Taiwan, Vietnam, Philippines, Malaysia, Brunei
Paracel Islands	China, Taiwan, Vietnam

The degree of danger from a conflict between Indonesia and Malaysia, for example, would be significant but limited. Although both states have a few good ships and aircraft, neither is considered able to sustain combat operations at sea for any length of time. Major ports and airfields of each are within range of the other's attack aircraft. An attack on them would seriously disrupt maritime traffic during hostilities and limit traffic intended for those ports for some time thereafter. It is reasonable to assume, however, that attacks on the other's air and naval assets would weaken their already low level of capability to disrupt maritime passage. Thus, the character of a possible conflict has been labelled a flash war, with little likelihood of blocking shipping for more than a few weeks. Supporting this conclusion is the fact that even during the period of Confrontation (the early 1960s) the straits were kept open. If ports were damaged in the hostilities, this would obviously restrict shipping temporarily and cause considerable economic damage until restructuring of trade routes or reconstruction of port facilities could be completed.

Shifts in leadership within the states of Southeast Asia are not likely to bring to power a government ready to attack any other nation in the region. The states of Southeast Asia are not ripe for dramatic political change. Evidence of their political maturity made manifest in 1995 included: a fair election in Malaysia, in which a coalition headed by Prime Minister Mahathir won an overwhelming victory; the election of pro-Ramos candidates for the Philippine Senate; and the peaceful transfer of power to a governing coalition under the Chart Thai party in Thailand. These events belie the notion that Southeast Asian states are somehow ripe for radical change in regimes or the fundamental way in which governance is exercised. Judged from that point of view, there is virtually no chance of dramatic political change in any ASEAN country, with the possible exception of Indonesia.

The 30-year Suharto era, which began with a bloody coup after which hundreds of thousands of Indonesians were killed,

will end over the next few years. Although Indonesia has changed greatly since the beginning of the Suharto era, a succession struggle could cause problems, such as the resort to violence by dissident elements during a period of political confusion. In 1994 a labor dispute in Sumatra escalated to violence, destroying an estimated billion dollars of property, directed in part against overseas Chinese, who control 75 percent of private sector activity.³¹ The likelihood of transition violence is reduced by the fact that the major political actors, such as the armed forces and the Muslim leadership, are products of the current political system and are committed to maintaining political order. However, without an established process for presidential succession, there is a possibility of renewed violence, especially of the type directed at the Chinese minority. Were such violence to occur, the impact on nearby straits would likely be negligible unless Beijing decided to resort to gunboat diplomacy to "protect" the overseas Chinese population. China is not presently capable of doing this, but did include Vietnamese oppression of its Chinese minority as one reason for hostile action against Vietnam during the 1980s. It is, therefore, at least a possibility that China may resort to such tactics as its power grows in the 21st century. Table 6 summarizes these considerations.

Scenario 4: China intervenes in Southeast Asia

China is the paramount regional power, even though its ability to project power is extremely limited at present. Over half the Chinese submarine force is non-operational, but that still leaves almost 50 attack submarines in the force, along with 18 guided missile destroyers and 37 frigates. Its strategic forces are small compared to those of Russia or the United States, but it is credited with some 24 ICBMs and 60+ IRBMs.³² Regardless of the quality of the force, its sheer size could overwhelm the small navies of Southeast Asia in waters distant from their land-based air. Thus, a scenario in which China decided to use military force in the South China Sea is realistic from a capabilities viewpoint. Such a decision would raise questions about whether and under

what circumstances the enormous flow of traffic through that sea might be impeded.

The first Chinese action that might restrict traffic would be an attack upon other claimants in the Spratly Islands. China claims all of the Spratlys, and Vietnam, the Philippines, Malaysia, and Taiwan claim parts of them. As of late 1995, Vietnam occupied 25 features (rocks, shoals, cays, reefs, and islands), the Philippines eight, China eight, Malaysia six, and Taiwan one. As it did in 1988, China could take military measures to evict any of the other claimants, occupy the islands, and declare suzerainty over them. In today's environment, this would probably entail a Chinese flotilla, backed by minimal air cover, forcing the small Southeast Asian garrisons to capitulate or be destroyed by naval or air bombardment. The issue is to what degree such action would impede the flow of trade through the South China Sea.

Two factors argue against disruption of trade under such circumstances. First, the passages to the west of the Spratlys are quite distant from the islands. For safety reasons, mariners have traditionally steered clear of the Spratlys. These channels, through which most of the South China Sea traffic flows, cover an area some 150 n.mi. wide, and could allow passage without direct involvement in the fighting (see the map on page 3). Those to the east off Palawan are narrower and closer to the Spratlys, but still some distance from likely areas of dispute. (The April 1995 confrontation at Mischief Reef was over 100 n.mi. from these sea lanes.) The second and more important factor is that any Chinese attack upon the Spratlys would likely be relatively short and confined to the immediate waters of the islands themselves. The national forces presently occupying the features are minuscule in size compared to potential Chinese deployments, and in many cases consist of but a squad or platoon of militia in a few huts on stilts over rock outcroppings. Chinese gunboats would have little trouble dispatching them. Military opposition by any of the attacked countries cannot be ruled out, but if it were to occur, it would disrupt shipping for only a short period in

the vicinity of the islands, as none of the potential belligerents can sustain a major force in the vicinity of the Spratlys. Thus, the major sea lanes could be expected to remain open.

This conclusion is reinforced by repeated Chinese statements that their claims to the South China Sea are not intended to impede freedom of navigation therein, and that attempts to so characterize them are erroneous. For example, the Chinese Foreign Ministry reported on April 20, 1995, as follows:

While safeguarding its sovereignty over the Nansha (Spratly) Islands and its maritime rights and interests, China will fulfill its duty of guaranteeing freedom of navigation for foreign ships and air routes through and over the international passage of the South China Sea according to international law. There are ulterior motives behind the spreading of the rumor that China's peaceful activities in the Nansha Islands affect navigation.³³

The second potential Chinese action in the South China Sea is an attack on shipping and oil rigs and equipment related to petroleum exploration and development on the continental shelves of Indonesia and Vietnam. Feeling left out of the oil and gas development in this area, China might choose to threaten military action to support either its claims to the fields or its oft-stated preference for their joint development. It is highly unlikely that China would take action against the Pertamina/Exxon project to develop an oil and gas field near Natuna Island in the southern end of the South China Sea. The project involves an estimated investment of \$35 billion and is on the fringe of an area claimed by Beijing on Chinese maps. Further west, however, there is a sharp and ongoing dispute between China and Vietnam over rights and ownership of blocks near the edge of the Vietnamese continental shelf. During the past year Vietnam drove off a Chinese seismic ship in a block awarded by China to Crestone, after which Chinese warships blockaded a Vietnamese oil-drilling rig in a block awarded by Vietnam to Mobil. Unlike the Spratlys, this potential zone of conflict sits astride the major

sea lanes connecting the Persian Gulf and the nations of Southeast Asia with China and the booming economies of Northeast Asia.

Although unlikely, a military conflict in either of these regions would have the potential to seriously disrupt nearby passing ships. Air and naval forces from both China and Vietnam could be engaged over the disputed zones. As they pass, commercial ships could be mistaken as hostile, or simply come within the zone of fire of the belligerents. From a purely military point of view, combat so far south could involve operations disadvantageous to China, which would have to contend with nearby naval and land-based air. Given the limits to Chinese airpower, even Vietnam could probably bring greater force to bear in a local confrontation in this region. However, unlike the Spratlys, such operations could easily escalate to air and naval engagements in other areas, such as the Sino-Vietnamese border and Vietnamese ports and airfields within range of Chinese land-based air. This would undoubtedly lead to greater Chinese military activity in the South China Sea, which in turn could pose additional dangers to shipping, especially off the continental shelf of Vietnam.

Table 6 summarizes these factors, both for possible Chinese intervention in the Spratlys alone and for its intervention in the dispute over petroleum exploration and development near the continental shelf of Vietnam.

Scenario 5: China blockades Taiwan

Another scenario often posited is a Chinese blockade of Taiwan. The impact on Southeast Asian sea lanes could be twofold: (1) a normal backup of traffic caused by military activity in the northern South China Sea, the southern East China Sea, the Formosa Strait, and the Bashi Channel; and (2) retaliation by Beijing against any efforts to resupply Taiwan or impede the flow of trade to China. The latter could involve actions by Taiwan or any nation friendly to Taiwan.

Besides the risk to ships passing in the vicinity of Taiwan, a blockade of the island could disrupt normal traffic patterns and threaten congestion south of the island. A blockade could involve exclusion zones for normal commercial shipping, as well as harassment of ships that approach the exclusion zone. Mines are another possibility, as is strafing of ships that intentionally or inadvertently approach the island. Given the volume of traffic, with over \$500 billion of annual trade crossing the waters around Taiwan annually, any disruption could easily be felt as far south as Singapore. Such disruption might be minimized if shipping to and from Northeast Asia steered clear of Taiwan on a wide berth (200 n.mi.) west of the island, entering/exiting the South China Sea off northern Luzon. The duration of blockage in this scenario is considered to be weeks rather than the longer period such a blockade might last, because China has such an enormous stake in international trade that it has every incentive to accommodate routes for trade not bound for Taiwan.

Retaliation by Beijing to any efforts to resupply Taiwan would likely involve attacks against ships entering ports in Taiwan or within a Chinese-designated zone around the island. Ships approaching or within that zone would definitely be in danger, as Beijing could perceive them as a direct threat to its blockade. Any effort to interfere with shipping into China could also invite Chinese attempts at retaliation. Beyond the South China Sea, Chinese ability to project power is dubious at the present time, both because the PLA Navy is unable to sustain operations that far from the Chinese coast, and because Chinese air power is negligible for such a mission. The MiG-19s, which constitute half the air force, cannot reach the straits, and the Su-27s rarely fly over water, as much due to the likelihood of pilot defection as to pilot inexperience.³⁴

Summary

Based on the foregoing considerations, table 6 shows the qualitative judgments reached for the straits and the South China Sea under the five scenarios. Again, vulnerability is

described in terms of likelihood, extent of blockage, and duration of that blockage. Although there is no imminent threat from China, the scenarios involving it are considered at least possible. The extent of damage would be greatest in the scenarios involving hostilities by Southeast Asian states, the very states that benefit the most from maritime trade. In no case does the expected duration of blockage exceed several weeks.

Table 6. Vulnerability of the sea lanes to military conflict^a

	Scenario 1:	Scenario 2:	Scenario 3:	Scenario 4:		Scenario 5:
	Sea mines	SEA state action	SEA conflict	Chinese intervention 1. Spratly	2. Shelf	Taiwan blockade
Who is involved	Any state or terrorist organization	Any SEA state	Indonesia & Malaysia	PRC & VN or Phil.	PRC & VN or Indon.	PRC & Taiwan
Likelihood of scenario	L	L	L	M	M	L
Extent of blockage						
Malacca	H	H	H	L	L	L
Sunda	M	M	M	L	L	L
Lombok	M	M	L	L	L	L
S. China Sea	M	M	L	L	M	M
Duration of blockage						
Malacca	W+	W	W	D	W	W
Sunda	W	W	W	D	W	W
Lombok	W	W	D	D	D	W
S. China Sea	W	W	D	D	W	W

a. Likelihood/Extent: H = high, M = medium or partial, L = low.
Duration: Y = years, W = weeks, D = days.

Conclusions

With a trillion dollars of trade passing through the principal sea lanes of Southeast Asia each year, the possibility of blockage, from whatever source, deserves close examination. This survey examined ways, both military and non-military, in which these sea lanes might be blocked. An analysis of the likelihood, extent, and duration of blockage resulted in the conclusions outlined below:

Vulnerability

- The sea lanes of Southeast Asia are vulnerable to a variety of threats, but few of these threats could cause problems for any length of time. Most would hamper shipping for only a few days or weeks.
- The straits of Malacca and Singapore are the most heavily trafficked and also the most susceptible to blockage or disruption. Sea lanes through the South China Sea are the least susceptible to blockage or disruption.

Non-military threats

- The volume of trade through the straits of Malacca and Singapore is rising dramatically, and will likely result in efforts by concerned regional governments to further regulate and restrict shipping.
- Piracy is a medium-level possibility, but has little direct effect on strait shipping except in cases resulting in loss of command. Piracy in the straits of Malacca and Singapore has been a chronic problem, but has declined sharply, in large part due to cooperation by the maritime authorities of Indonesia, Singapore, and Malaysia.
- Accidents are also a medium-level possibility. Ships not under command due to piracy and VLCCs exceeding draft limits in the straits of Malacca and Singapore present the greatest danger and could easily cause accidents that disrupt traffic for days or even weeks.

Military threats

- Currently, there are no imminent military threats to the Southeast Asian sea lanes. However, sea mines laid covertly by a terrorist organization or by a national government as part of a military campaign are a potentially dangerous threat. The threat or use of mines could seriously restrict shipping, particularly through the straits of Malacca and Singapore, which are the most vulnerable. It would take a concerted effort by both naval forces and commercial shipping to reopen sea lanes blocked by mines.
- Of the five military scenarios considered, the most likely to restrict shipping in the South China Sea is Chinese intervention in the oil and gas disputes off the continental shelf of Vietnam. Chinese action against these fields could impede traffic for a short time, or, if fighting were to escalate, for a longer period.
- Several Southeast Asian nations have a limited military capability to disrupt seaborne trade to and through the region; however, to do so would invite political, economic, and military retaliation that would far exceed any supposed benefits of impeding shipping, to the point where such action must be considered hypothetical under existing circumstances.
- China has the military capability to seize many of the Spratly Islands, but any conflict attending such action would be brief and would not significantly affect the sea lanes through the South China Sea. China does not now have the military capability to sustain operations in the straits of Malacca, Sunda, or Lombok.

Economic incentives to keep SLOCs open

- China has an enormous incentive to keep the Southeast Asian sea lanes open. Including its trade through Hong Kong, Chinese trade through these sea lanes is well over

\$100 billion per year, and growing at a rate in excess of 16 percent per year. Disruption of that trade would severely affect Chinese modernization. Moreover, it could restrain the economies of China's trading partners, including Japan, on which continued growth depends.

- Countries with the greatest capability to impede traffic through the straits, the ASEAN states, have the strongest economic motivation not to do so. In 1994, the combined ASEAN international trade through the straits was \$432 billion. Including domestic trade, it was close to a half trillion dollars.
- With \$260 billion total trade through the sea lanes in 1994, Japan has the largest stake in keeping them open and is likely to use its economic leverage to do so.

U.S. policy and presence

- There now appear to be no obvious or imminent challenges to freedom of navigation via the Southeast Asian SLOCs. Neither non-military nor military threats to these sea lanes are presently serious or sustained.
- On the other hand, conditions in Southeast Asia could change. A number of disputes in the region could become flash points for future conflicts that would affect the sea lanes. Extended blockage of the straits is unlikely. If this occurred, there would be serious economic and political consequences for Southeast Asia and for other major trading partners of the United States in Europe, Asia, and the Middle East as well as for the United States itself (see endnote 1).
- The policy of the United States is to resist threats to freedom of navigation in the area, and U.S. forces are committed to supporting that policy. U.S. naval forces, through their forward presence in the region, can provide both a deterrent to potential threats and a means to respond to such challenges should they develop.

Appendix: Major weapon systems of Southeast Asian states³⁵

Brunei	Thailand
3 patrol boats with Exocet	6 FFs
2 combat aircraft	5 Corvettes (2 with Harpoon)
	3 missile craft with Exocet
Cambodia	6 MCM vessels
10 old patrol boats	18 F-16s
19 MiG-21s	55 F-5s
	7 AC 47s
Indonesia	Vietnam
6 FFs with Harpoon	7 FFs
4 FFs with Exocet	10 missile craft with Styx
2 Type 209 subs	11 MCM boats
4 patrol craft with Exocet	65 Su-22s, Su-27s
11 F-16s	125 MiG-21s
24 A-4s	
12 F-5s	
Malaysia	
2 FFs with Exocet	
37 patrol boats (8 with Exocet)	
4 MCM vessels	
35 A-4s	
11 F-5Es	
18 MiG-29s	
Philippines	
1 FF	
9 offshore patrol boats	
7 F-5s	
Singapore	
6 Corvettes with Harpoon	
6 missile craft with Gabriel	
1 MCM vessel with four more on order	
62 A-4s	
7 F-16s with 11 more in U.S.	
38 F-5s	

Endnotes

1. John H. Noer, *Maritime Economic Interests in the Sea Lines of Communication Through the South China Sea*, Center for Naval Analyses, December 1995.
2. Another CNA study focuses on military and non-military threats to U.S. Navy transit through key straits on a global basis; CNA Research Memorandum 94-38, *Challenges in Strategic Waters*, by Thomas Hirschfeld and Richard Hayes, June 1994.
3. From Defense Mapping Agency, Pub. 160, *Sailing Directions for Southeast Asia*, Third Edition, 1991, and Pub. 161, *Sailing Directions for the South China Sea and the Gulf of Thailand*, Fifth Edition, 1991.
4. This figure corresponds to the 1995 year-end level projected from data presented in the Kuala Lumpur Workshop on the Strait of Malacca, Malaysian Institute of Maritime Affairs, January 1994, as referenced in United States Pacific Command *Asia Pacific Economic Update*, summer 1995. The figure is also cited by Mark Farley, Naval Postgraduate School Thesis, *International and Regional Trends in Maritime Piracy, 1989-1993*, p. 29, December 1993. Of the 200, some 114 are estimated as merchant ships of 1,000 DWT or greater on inter-regional international trade; Noer, *op.cit.* Data on the sea lanes are from the Defense Mapping Agency, Pub. 160, *Sailing Directions for Southeast Asia*, 1991, and Pub. 163, *Sailing Directions for Borneo, Jawa, Sulawesi and Nusa Tenggara*, 1990; and Catherine Osman, *The Straits of Malacca and Singapore: The Neglected Choke Point*, Naval Postgraduate School, 1987.
5. The data in this table are conservative estimates based on trade reported by the International Monetary Fund, *Direction of Trade Statistics Yearbook (DOTS)*, September 1995. DOTS lists 1994 trade on a country-by-country basis, to include both exports and imports with other countries. Trade between each of the countries and regions listed was examined in

detail to avoid double-counting and to include only trade through the straits. The table was adjusted to discount air and overland trade. The totals do not include smaller Asia-Pacific nations, such as Macao, Papua New Guinea, the South Pacific islands, and the Solomons, or any U.S. trade with South Asia. The members of the Association of Southeast Asian Nations (ASEAN) include the Philippines, Malaysia, Indonesia, Singapore, Thailand, Brunei, and Vietnam.

6. Singapore derives most of its trade-related income from transshipment and from servicing passing ships. Some 50 percent of port calls in Singapore are solely for the purpose of refueling, and another 30 percent of ships that are in port to work cargo avail themselves of ancillary services. Charles Dragonette, Office of Naval Intelligence, 1995.
7. David G. Wiencek and William M. Carpenter, "Maritime Piracy in Asia," *Asian Security Survey: An Assessment of Political-Security Issues in the Asia-Pacific Region*, M.E. Sharp, Inc., forthcoming.
8. *Ibid.*; David Schlesinger, *Pirates—Some in Uniform—Prowl the South China Sea*, Reuters, July 12 and 19, 1995; and Farley, *op.cit.*, pp. 19-20. While not under command, many ships can continue under automatic pilot, but this condition poses serious risks to safe passage. The veracity of some incidents of piracy is open to question, but on the other hand, many pirate incidents are believed to go unreported for fear of raising insurance rates.
9. Rear Admiral Kwek Siew Jin, Republic of Singapore Navy, *Sea Robberies in the Singapore Strait*, International Seapower Symposium, U.S. Naval War College, November 5-8, 1995. He described Singapore-Indonesia cooperation as follows: "If either party needs to cross the boundary into the other side's sector in its pursuit of offenders (pirates), it would then quickly inform his counterpart vessel. The counterpart would then immediately dispatch its vessels to help deal with the offenders. This hot-pursuit style arrangement between

Singapore and Indonesia has made coordinated anti-sea robbery patrol more effective, such that sea robbers would not be able to find sanctuary just by crossing territorial water boundaries. On top of these patrols, each country would also take steps to apprehend any sea robbers residing in or using their country as a base for their operations."

10. Schlesinger, *ibid.*, and Mark C. Farley, *International and Regional Trends in Maritime Piracy 1989-1993*, Naval Postgraduate School, December 1993.
11. *Ibid.*
12. A discussion of the effects of a LNG tanker leak or VLCC oil spill is found in Mark J. Valencia and James B. Marsh, "Access to Straits and Sea Lanes in Southeast Asian Seas: Legal, Economic, and Strategic Considerations," *Journal of Maritime Law and Commerce*, October 1985.
13. *Sailing Directions for Southeast Asia*, *op.cit.*
14. *Encyclopedia Britannica*, "Volcanos," 1987.
15. *The Wall Street Journal*, February 19, 1996, p. 1.
16. Raw data for these estimates are from *Direction of Trade Statistics Quarterly*, March 1995, and *Direction of Trade Statistics Yearbook 1995*, September 1995, both published by the International Monetary Fund. Our estimates of the amount of trade through the Southeast Asian sea lanes differ somewhat from the estimates in the study by John Noer, *op.cit.*, because of both different data sources and years. The Noer study provides a detailed analysis of trade routes, commodities, and the economic impact of diversion to other sea lanes.
17. Although closure of the port of Singapore would eventually result in restructuring trade routes, such change would take considerable time, especially if the construction of substitute regional refinery capacity were attempted. The impact on Singapore, obviously, would be devastating.

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18. The Petroleum Association of Japan, as quoted in the *Petroleum Economist*, July 1994, p. 67. Thirteen percent of Japan's crude oil imports come from Southeast Asia.
 19. *Oil and Gas Journal*, April 10, 1995; and *Petroleum Economist*, August 1994.
 20. In mid June 1995, futures prices on the Chicago Board Options Exchange jumped wildly on rumors that China was considering massive grain purchases.
 21. Department of State, *United States Policy on the Sprattlys and the South China Sea*, May 10, 1995; and Department of Defense, *United States Security Strategy for the East Asia-Pacific Region*, 1995, p. 20.
 22. *Defense News*, October 23-29, 1995, p. 8.
 23. These actions are discussed in the context of mine laying and mine countermeasures by Barry Clark, Jurgen Fielitz, and Malcolm Touchin, in *Brassey's Seapower, Volume 10, Coastal Forces*, pp. 48-149.
 24. *Sailing Directions for Southeast Asia*, *op.cit.*, pp. 82-91.
 25. Commodore Teo, as quoted in *Janes Intelligence Review, Special Report No 7*, 1995, p. 21.
 26. Peter Lewis Young, "Mining the Straits in Southeast Asia," *Janes Intelligence Review*, February 1996.
 27. Osman, *op. cit.*, p. 70.
 28. Tidal currents up to 6 knots, with eddies and rips, are common on the western side of Sunda; eddies and whirlpools occur on the southwest side. In the narrows of Lombok there are currents up to 6 knots. Defense Mapping Agency, Pub. 163, *Sailing Directions for Borneo, Jawa, Sulawesi, and Nusa Tenggara*, 1990, pp. 114, 115, 150-155.
 29. For example, when mines were placed in the Red Sea in 1984, 18 commercial vessels were damaged, but none so seriously that they could not continue their voyages. Charles
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Dragonette, Office of Naval Intelligence, 1995. The buoyancy and compartmentalization of most VLCCs is an additional factor.

30. Geoffrey Till, "Trouble in Paradise, Maritime Risks and Threats in the Western Pacific," *Janes Intelligence Review, Special Report No 7*, 1995.
31. Adam Schwarz, *Indonesia in the 1990s: More than Meets the Eye*, East-West Center, August 1995.
32. International Institute for Strategic Studies, *The Military Balance, 1994-1995*.
33. Ministry of Foreign Affairs, People's Republic of China, *Beijing Review*, May 8-14, 1995, p. 22.
34. For an analysis of the weaknesses of the PLA Air Force, see Jonathan D. Pollack et al., *China's Air Force Enters the 21st Century*, RAND, 1995.
35. The information presented in the appendix was taken from International Institute for Strategic Studies, *Military Balance 1995-96*, October 1995.